UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

DALI WIRELESS, INC.,

Plaintiff,

v.

CORNING OPTICAL COMMUNICATIONS LLC,

Defendant.

Case No. 20-cv-06469-EMC

CLAIM CONSTRUCTION ORDER

Docket No. 76

Plaintiff Dali Wireless, Inc. has sued Defendant Corning Optical Communications, LLC for patent infringement. There are three patents at issue:

- '454 patent, titled "Optimization of traffic load in a distributed antenna system."
- '261 patent, titled "Self-optimizing distributed antenna system using soft frequency reuse."
- '358 patent, titled "Method and system for soft frequency reuse in a distributed antenna system."

As the titles above indicate, the three patents are all related to a distributed antenna system (DAS). As explained in one of the patents, "[d]istributed antenna systems (DAS) have been widely implemented in state-of-the art cellular communication systems to cover dead spots in wireless communications systems." '261 patent, col. 3, ll. 49-52.

> A DAS breaks the traditional radio base station architecture into two pieces: a central processing facility and a set of distributed antenna (DA), connected to the central facility by a high-bandwidth network. The DAS network transports radio signals, in either analog or digital form, to/from the central facility where all the base station's processing is performed. By replacing a single high-power antenna with several low-power antennas, distributed to give the same

> coverage as the single antenna, a DAS is able to provide more reliable wireless services within a geographic area or structure while reducing its power consumption.

'261 patent, col. 3, ll. 53-63.

The parties have asked the Court to construe ten terms used in the three patents. Below are the Court's constructions.

I. LEGAL STANDARD

Claim construction is a question of law, although it may have factual underpinnings. *See Icon Health & Fitness, Inc. v. Polar Electro Oy*, 656 Fed. App'x 1008, 1013 (Fed. Cir. 2016); *see also Multilayer Stretch Cling Film Holdings, Inc. v. Berry Plastics Corp.*, 831 F.3d 1350, 1357 (Fed. Cir. 2016). It "serves to define the scope of the patented invention and the patentee's right to exclude." *HTC Corp. v. Cellular Communs. Equip., LLC*, 877 F.3d 1361, 1367 (Fed. Cir. 2017); *see also O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1360 (Fed. Cir. 2008) (stating that "the purpose of claim construction is 'to determin[e] the meaning and scope of the patent claims asserted to be infringed'").

> Words of a claim are generally given their ordinary and customary meaning, which is the meaning a term would have to a person of ordinary skill in the art after reviewing the intrinsic record at the time of the invention. "In some cases, the ordinary meaning of claim language . . . may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words." However, in many cases, the meaning of a claim term as understood by persons of skill in the art is not readily apparent.

Id. (quoting *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005)).

> Because the meaning of a claim term as understood by persons of skill in the art is often not immediately apparent, and because patentees frequently use terms idiosyncratically, the court looks to "those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean." Those sources include "the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art."

Phillips, 415 F.3d at 1314. Although extrinsic evidence "can shed useful light on the relevant art, . . . it is less significant than the intrinsic record in determining the legally operative meaning of

claim language." *Id.* at 1317 (internal quotation marks omitted).

II. DISCUSSION

A. "Digital Access Unit" / "DAU" ('454 patent, claims 1, 2, 5)

Dali's Proposed Construction	Corning's Proposed Construction	Court's Construction
"Digital Access Unit" / "DAU" ('454 Patent, claims 1, 2, 5)		
a unit that manages communications between a mobile network operator and one or more radio remote units[1]	a unit of a DAS that supports the transport of radio resource signals between at least one signal source and the one or more DAUs and/or plurality of DRUs	a unit in a DAS that controls the transport/routing and gain of radio resource signals between (1) a signal source(s) (such as a base transceiver station or picocell) and (2) DRUs

The term "digital access unit" or "DAU" appears in the '454 patent. Claim 1 is a representative claim using the term, providing in relevant part as follows:

> A system for dynamically routing signals in a Distributed Antenna System (DAS) operable to communicate with a plurality of signal sources, the system comprising:
>
> > one or more **Digital Access Units (DAUs)** operable to receive at least one signal from at least one of a first signal source and a second signal source from the plurality of signal sources, each DAU of the one or more DAUs including an input port configured as an uplink/downlink port and an output port configured as an uplink/downlink port;

[1] Dali proposed a slightly different construction in its opening brief but modified its construction in its reply brief to address a concern raised by Corning. *See* Reply at 1.

In its papers, Dali underscores that its construction is consistent with the construction given to the term "DAU" by a federal court in Delaware in *Dali Wireless, Inc. v. Commscope Techs. LLC*, No. 19-952 (MN) (D. Del.). *See* Schumann Decl., Ex. 8 (Order at 6-7). But there the court was not construing the '454 patent.

> a plurality of Digital Remote Units (DRUs) coupled to the one or more DAUs and operable to transport signals between the plurality of DRUs and the one or more DAUs;
>
> a plurality of sectors formed from the plurality of DRUs comprising a first sector and a second sector different from the first sector, each sector comprising a subset of the plurality of DRUs; and
>
> a traffic monitoring unit coupled to at least one of the DAUs comprising the input port and output port each configured as an uplink/downlink port . . . .

'454 patent, claim 1 (emphasis added).

There are several disputes related to the DAU: (1) is a DAU a unit of DAS?; (2) what are the structures for which a DAU serves as an intermediary?; and (3) what function does a DAU perform? In general, Corning's construction is more on point.

1. Is a DAU a Unit of a DAS?

Corning argues that a DAU is a unit of a DAS and thus the construction should reflect such. In response, Dali argues that the Court should not, in effect, import the term "DAS" from the preamble. Dali is correct in its assessment that deeming a DAU a unit of a DAS would essentially import the term "DAS" from the preamble into the claim. However, Corning has the better argument that a DAU is a unit of a DAS – *i.e.*, the term "DAS" from the preamble *should* be imported.

"Whether a preamble stating the purpose and context of the invention constitutes a limitation of the claimed process is determined on the facts of each case in light of the overall form of the claim, and the invention as described in the specification and illuminated in the prosecution history." *Applied Mats., Inc. v. Adv. Semiconductor Mats. Am., Inc.*, 98 F.3d 1563, 1572-73 (Fed. Cir. 1996); *see also Catalina Mktg. Int'l v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (stating that, when a court decides whether a preamble is a limitation, it must consider "'the entire[] . . . patent to gain an understanding of what the inventors actually invented and intended to encompass by the claim'").

In general, a preamble limits the invention if it recites essential structure or steps, or if it is "necessary to give life, meaning, and vitality" to the claim; conversely, a preamble is not limiting

"where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention." *Id.* The Federal Circuit has stated that "[n]o litmus test defines when a preamble limits claim scope," but "[s]ome guideposts . . . have emerged from various cases discussing the preamble's effect on claim scope." *Id.*

For example:

- "Jepson claiming[2] generally indicates intent to use the preamble to define the claimed invention, thereby limiting claim scope."
- "[W]hen the preamble is essential to understand limitations or terms in the claim body, the preamble limits claim scope."
- "[W]hen reciting additional structure or steps underscored as important by the specification, the preamble may operate as a claim limitation."
- "[A] preamble generally is not limiting when the claim body describes a structurally complete invention such that deletion of the preamble phrase does not affect the structure or steps of the claimed invention."

Intri-Plex Techs., Inc. v. NHK Int'l Corp., No. 17-cv-01097-EMC, 2018 U.S. Dist. LEXIS 16877, at *7-8 (N.D. Cal. Feb. 1, 2018) (internal quotation marks omitted).

The factors above weigh in favor of deeming the term "DAS" as used in the preamble a claim limitation. For instance, claim 1 of the '454 patent has some similarity to a Jepson claim in that a DAS is a known system and the '454 patent is claiming an improvement in that system. Also, a DAS is essential to understand the terms used in the claim body (including but not limited to DRU). Furthermore, the specification of the '454 patent makes clear the importance of a DAS

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2 A "Jepson" claim is one that contains (1) a preamble that recites an old device, process, or combination, (2) a transition phrase such as "wherein the improvement comprises," and (3) a body which states the new elements or improvements upon the old device, process, or combination. The preamble in a Jepson claim constitutes "a limitation for purposes of determining patentability and infringement."

Xilinx, Inc. v. Altera Corp., No. 93-20409 SW, CIVIL NO. 96-20922 SW, 1998 U.S. Dist. LEXIS 14774, at *6-7 (N.D. Cal. July 30, 1998).

to the invention – from the title of the patent to the abstract and the summary of the invention. Finally, the claim body does not describe a structurally complete invention in that deletion of the term "DAS" from the preamble would detract from understanding the claim. *See generally Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349 (Fed. Cir. 2012) (finding the preamble term "rotary cutter deck" limiting in nature – *e.g.*, because it was necessary to understand the subject matter encompassed by the claim and because it described a fundamental characteristic of the claimed invention that informed one of skill in the art as to the structure required by the claim; adding that the title of the patent, the summary of the invention, and every drawing described the invention as a deck for a rotary cutter).

Accordingly, Corning is correct that a DAU is a unit of a DAS.

2. What Are the Structures for Which a DAU Serves as an Intermediary?

The parties do not dispute that a DAU essentially serves as an intermediary between two structures. *See, e.g.*, '454 patent, FIG. 1 (indicating that a DAU(s) is positioned between a base transceiver station (BTS) and DRUs). However, they disagree as to what structures should be identified as the structures for which a DAU is an intermediary. According to Dali, a DAU connects (1) a mobile network operator and (2) radio remote units ("RRUs"); according to Corning, a DAU connects (1) a signal source and (2) DRUs (*i.e.*, digital remote units).

a. Mobile Network Operator v. Signal Source

As indicated above, the parties' first dispute is whether the structure at one end should be deemed a mobile network operator (Dali) or a signal source (Corning).

The Court rejects Dali's position. The specification for the '454 patent – though it mentions operators in passing – never discusses a DAU acting as a direct intermediary for an operator. Rather, it typically refers to a DAU acting as a direct intermediary for a base transceiver station (BTS). For example:

- FIG. 1 of the patent indicates that a DAU(s) is connected on one end to a BTS and on the other end to DRUs.
- The patent refers to a "DAS network compris[ing] one or more digital access units (DAUs) that function as the interface between the base stations and the digital

remote units (DRUs)." '454 patent, col. 4, ll. 60-63.

Admittedly, Dali's position is not entirely without merit. It appears that a BTS is connected to a mobile network operator and, in in this respect, a DAU does have a connection to an operator – *i.e.*, through the BTS. However, for purposes of construction, and in light of the specification, a DAU is better defined in conjunction with its *direct* connections, and not with its connections further down the line.

Corning suggests that the direct connection be defined as simply a "signal source" (the term that is used in claim 1). It does so in recognition of the fact that a BTS is not the only kind of signal source identified by the '454 patent. FIG. 6, for example, identifies the signal source as a BTS Hotel with picocells inside. *See also* '454 patent, col. 9, ll. 58-59 ("As shown in FIG. 6, the base station hotel (610) is comprised of multiple Picocells."). However, simply repeating "signal source" in the construction would likely be unhelpful to the jury. It is likely that the jury would benefit from having at least examples of what a signal source can be – for instance, a BTS or a picocell. The Court therefore shall incorporate examples in its construction.

b. Radio Remote Unit ("RRU") v. Digital Remote Unit ("DRU")

The parties' second dispute is whether the structure at the other end should be identified as RRUs (Dali) or DRUs (Corning).

Using the term "RRU" – as Dali suggests – does not make much sense, particularly since the patent does not use that terminology.[3] In contrast, the term "DRU" is used in the patent. Moreover, the jury will not be confused by reference to a DRU because the parties have asked the Court to construe that term as well. *See infra*.

3. What Function Does a DAU Perform?

Finally, the parties disagree as to what function a DAU performs. In particular, the parties

[3] Dali argues that a RRU is the same thing as a DRU but it has suggested the use of "RRU" because it is "more descriptive and helpful to the jury." Op. Br. at 6 n.1. Corning disagrees that a RRU is the same thing as a DRU. *See* Resp. Br. at 8 (arguing that "RRU" "does not appear anywhere in the '454 patent, and no POSA [person of skill in the art] would have thought to replace the DRUs in the claims with RRUs"; adding that, in another Dali patent (the '300 patent), RRUs and DRUs are differentiated – a DRU communicates with a DAU while an RRU communicates with a base station).

disagree as to (1) whether a DAU does more than just transport/route signals and (2) what kind of signals a DAU deals with.

a. Transporting/Routing Signals

The parties agree that a DAU transports/routes signals. This is borne out by the patent specification. *See, e.g.*, '454 patent, col. 1, ll. 45-48 ("The system includes a plurality of Digital Access Units (DAUs). The plurality of DAUs are coupled and operable to route signals between the plurality of DAUs."); '454 patent, col. 6, ll. 23-26 ("The DAUs are networked together to facilitate the routing of DRU signals among multiple DAUs. The DAUs support the transport of the RF downlink and RF uplink signals between the Base Station and the DRUs."); '454 patent, col. 6, ll. 62-66 ("Referring to FIG. 1 . . . , DAU 1 (102) receives downlink signals from BTS Sector 1 (101). DAU 1 translates the RF signals to optical signals and the optical fiber cable 103 transports the desired signals to DRU 2 (104).").

The parties' dispute arises from whether a DAU does more. In its papers, Dali suggests that a DAU can also *manage* signals and *create* signals.

On managing signals, there is some language in the specification suggesting that a DAU has an active role with respect to routing. *See, e.g.*, '454 patent, col. 6, ll. 30-37 ("The DAUs have the capability to control the gain (in small increments over a wide range) of the downlink and uplink signals that are transported between the DAU and the base station (or base stations) connected to that DAU. This capability provides flexibility to simultaneously control the uplink and downlink connectivity of the path between a particular DRU . . . and a particular base station sector."); '454 patent, col. 7, ll. 61-62 ("The DAUs control the routing of data between the base station and the DRUs."); '454 patent, col. 8, ll. 51-53 ("Because the DRUs data traffic has unique streams, the DAU Router has the mechanism to route the signal to different sectors."). But the Court finds the term "manage" inappropriate as it is somewhat nebulous and further could be construed to overstate what role a DAU plays (particularly, compared to the traffic monitoring unit). Thus, the Court shall not use the term "manage" but instead will draw on language used in the patent specification instead – *i.e.*, that a DAU controls the routing and gain of signals.

As for the assertion that a DAU creates signals, here, Dali's position is problematic.

According to Dali, the specification

> expressly describe[s] the DAU as creating and assigning radio resources to DRUs without having to obtain them from a BTS or other entity. For example, the embodiments described in reference to Figs. 6-8 show inputs from picocells that do not provide multiple radio resources to the DAU, but rather provide user data communications limited to a single frequency band. The DAU creates its own "radio resources" by combining the communications from multiple picocells and distributes those radio resources to DRUs as needed to optimize traffic load in the system. These embodiments do not require the DAU to receive "radio resource signals" from another entity such as a BTS, but rather, the DAU provides its own resource assignments.

Op. Br. at 9. But the part of the specification that Dali cites does not lend support to its position. For example, the specification provides in relevant part as follows:

> As shown in FIG. 6, the base station hotel (610) is comprised of multiple Picocells. The Picocells are typically wireless operator dependent and frequency band dependent. Picocells that operate in the same frequency band *are combined at RF and input to the respective DAUs*. The DAU radio resources from the combined Picocells are transported to a daisy-chained network of DRUs. Each individual DAUs radio resources provide coverage to an independent geographical area via the networked DRUs. . . .
>
> As shown in FIG. 7, the base station hotel (710) is comprised of multiple Picocells. The Picocells are typically wireless operator dependent and frequency band dependent. Picocells that operate in the same frequency band *are combined at RF and input to the respective DAUs*. The DAU radio resources from the combined Picocells are transported to a daisy-chained network of DRUs. Each individual DAUs [sic] radio resources provide coverage to an independent geographical area via the networked DRUs.

'454 patent, col. 10, ll. 5-13 (emphasis added). The italicized language above makes clear that DAUs do not combine communications from picocells, as Dali suggests; rather the combined communications from the picocells are input into the DAUs. There is no indication in the specification that DAUs create signals. Therefore, Dali's claim that DAUs create signals lacks merit.

b. Type of Signals

The parties' final dispute is what type of signals are transported/routed by a DAU. Dali contends that the signals can be just the user data (*e.g.*, voice/data communications) *without* the radio resources that carry the data; Corning asserts that the radio resource signals must be

transported/routed.[4]

Corning's position is amply supported by the specification.

- "One feature of embodiments of the present invention is the ability to route Base Station radio resources among the DRUs or group(s) of DRUs."[5] '454 patent, col. 6, ll. 16-18.
- "The DAUs support the transport of the RF downlink and RF uplink signals between the Base Station and the DRUs." '454 patent, col. 6, ll. 24-26.
- "As shown in FIG. 1, the individual base station sector's radio resources are transported to a daisy-chained network of DRUs. Each individual sector's radio resources provided coverage to an independent geographical area via the networked DRUs." '454 patent, col. 6, ll. 54-56; *see also* '454 patent, FIGs. 1, 3, 6-7 (reflecting that RF cables connect the DAUs to the BTSs).
- "Referring to FIG. 3 and by way of example, DAU 1 (302) receives downlink signals from BTS Sector 1 (301). DAU 1 translates the RF signals to optical signals and the optical fiber cable 303 transports the desired signals to DRU 2 (304)." '454 patent, col. 8, ll. 31-35.
- "As shown in FIG. 6, the base station hotel (610) is comprised of multiple

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[4] The parties do not dispute what radio resources are, particularly as that term is used in the specification. *See, e.g.*, '454 patent, col. 4, ll. 30-35 ("With Flexible Simulcast, the amount of radio resources (such as RF carriers, LTE Resource Blocks, CDMA codes or TDMA time slots) assigned to a particular DRU or group of DRUs can be set via software control to meet desired capacity and throughput objects or wireless subscriber needs."); *see also* Op. Br. at 8, 10 (describing radio resources as "radio system parameters that allow a system to provide more or less throughput or bandwidth to users"; also stating that radio resources are "parameters that instruct DRUs how to communicate underlying user data to phone users").

Nor do the parties seem to have any real dispute about what radio resource signals are, notwithstanding the fact that the term "radio resource signals" is not used in the '454 patent. *See, e.g.*, Proctor Decl. ¶ 49 (Corning's expert stating that the signals at issue in the patent "are defined by *what* they transport, which are radio resources in the form of radio resource signals") (emphasis added and omitted).

Rather, the parties' dispute is – as noted above – whether signals can be user data *without* any radio resources.

[5] Notably, this sentence from the specification does not limit itself to *one* embodiment of the present invention. Rather, the sentence simply refers to *one* feature *of embodiments*.

> Picocells. . . . The DAU radio resources from the combined Picocells are transported to a daisy-chained network of DRUs. Each individual DAUs [sic] radio resources provide coverage to an independent geographical area via the networked DRUs." '454 patent, col. 9, l. 58-66.

In contrast, Dali has not cited to any part of the specification that indicates signals can be just user data without the radio resources that carry the data. At the hearing, Dali pointed out that it owns a different patent (the '499 patent), which has some of the same inventors as the '454 patent, and, in that patent, the claims use the term "radio resources" instead of "signals." Thus, Dali contends, "radio resources" and "signals" must mean different things.[6] The problem for Dali is that the '499 patent cannot supplant what is stated in the specification of the '454 patent. *See Young Dental Mfg. Co. v. Q3 Special Prods.*, 112 F.3d 1137, 1143 (Fed. Cir. 1997) (stating that "[t]he specification that is relevant to claim construction is the specification of the patent in which the claims reside"); *cf. Medrad, Inc. v. MRI Devices Corp.*, 401 F.3d 1313, 1318 (Fed. Cir. 2005) (noting that "the manner in which [a] term is used in [a] patent may dictate a definition that differs from the definition that would be given to the same term in a different patent with a different specification or prosecution history").

To the extent Dali asserts that "importing limitations from the specification is inappropriate," this is true; however, "it is appropriate to consider the specification for proper context about the meaning of a contested term." *Asetek Danmark A/S v. CoolIT Sys.*, No. 19-cv-00410-EMC, 2020 U.S. Dist. LEXIS 129728, at *40 (N.D. Cal. July 22, 2020) (emphasis added). The Federal Circuit has "acknowledged the difficult distinction between 'using the specification to

[6] In a decision related to the '499 patent – involving Dali and a different party – *see John Mezzalingua Assocs., LLC v. Dali Wireless Inc.*, No. IPR202-01430 (PTAB) – the PTAB concluded that "radio resources" do not include the underlying data (i.e., the voice/data communications themselves). *See* Resp. Br., Ex. K (PTAB Decision at 10) ("To the extent that Petitioner intends its construction of 'radio resources' to encompass the data being transmitted via RF, we disagree that is a proper construction of the term. The '499 patent gives as examples of 'radio resources' RF carriers, CDMA codes, and TDMA time slots. No indication is given that the data carried wirelessly using these over the interface to the DAU is, itself, a radio resource. Rather, the '499 patent describes deploying 'radio resources' 'for use by a particular DRU which need[s] those radio resources within its coverage area,' or modifying system configuration to 'remove' 'radio resources' 'for use by a particular DRU.'").

interpret the meaning of a claim and importing limitations from the specification into the claim'" but explained that "the distinction is manageable 'if the . . . focus remains on understanding how a person of ordinary skill in the art would understand the claim terms.'" *Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1345 (Fed. Cir. 2008) (quoting *Phillips*, 415 F.3d at 1323). Notably, "the court should focus on how such a person would understand the claim term 'after reading the entire patent.'" *ICU Med., Inc. v. Alaris Med. Sys.*, 558 F.3d 1368, 1375 (Fed. Cir. 2009); *see also O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1360 (Fed. Cir. 2008) (stating that "[w]ords of a claim are generally given their ordinary and customary meaning, which is the meaning a term would have to a person of ordinary skill in the art *after reviewing the intrinsic record at the time of the invention*") (emphasis added).

For example, in *ICU*, the district court construed the term "spike" as "an elongated structure having a pointed tip for piercing the seal, which tip may be sharp or slightly rounded." It rejected the patent holder's proposed construction was which broader in nature ("an upward projection"). *See ICU*, 558 F.3d at 1374. On appeal, the Federal Circuit affirmed. After noting that a "court should focus on how such a person would understand the claim term 'after reading the entire patent,'" the Federal Circuit explained that, in the case under consideration,

> *[t]he specification never suggests that the spike can be anything other than pointed*. As the district court noted, (1) each figure depicts the spike as elongated and pointed; (2) in each figure depicting an activated valve, the spike pierces the seal; and (3) the patents neither describe piercing as optional nor describe any non-piercing item as a spike. Moreover, ICU offers no support from any intrinsic or extrinsic source in support of its claim that the ordinary meaning of spike would include a non-pointed structure such as a tube or a straw.

ICU, 558 F.3d at 1375 (emphasis added).

The situation in the instant case is similar to that in *ICU* – *e.g.*, although the term "signal" is arguably broad in nature, the specification for the '454 patent does not indicate that the DAU ever transports user data without radio resources. As Corning aptly argues, the patent does not *require* that user data be transported along with radio resources; the "signals transport radio resources and *may* – but are not *required* to – transport data." Resp. Br. at 9-10 (emphasis in original).

4. Summary

Accordingly, the Court adopts the following construction for the term "DAU": "a unit in a DAS that controls the transport/routing and gain of radio resource signals between (1) a signal source(s) (such as a base transceiver station or picocell) and (2) DRUs."

B. "digital remote unit" / "DRU" ('454 patent, claims 1, 6; '261 patent, claims 1, 4-6, 8)

Dali's Proposed Construction	**Corning's Proposed Construction**	**Court's Construction**
"digital remote unit" / "DRU" ('454 patent, claims 1, 6; '261 patent, claims 1, 4-6, 8)		
a unit in communication with a digital access unit for providing communications to and from user devices	a unit of a DAS that supports the transport of the radio resource signals between users and a central facility and/or one or more DAUs	a unit in a DAS that transports radio resource signals to and from user devices

The term "digital remote unit" or "DRU" is used in both the '454 and '261 patents. The parties agree that the term should be defined the same for both patents. For purposes of this order, the Court focuses on the '454 patent. Claim 1 of the '454 patent provides in relevant part as follows:

> A system for dynamically routing signals in a Distributed Antenna System (DAS) operable to communicate with a plurality of signal sources, the system comprising:
>
> one or more Digital Access Units (DAUs) operable to receive at least one signal from at least one of a first signal source and a second signal source from the plurality of signal sources, each DAU of the one or more DAUs including an input port configured as an uplink/downlink port and an output port configured as an uplink/downlink port;
>
> a plurality of **Digital Remote Units (DRUs)** coupled to the one or more DAUs and operable to transport signals between the plurality of DRUs and the one or more DAUs;

> a plurality of sectors formed from the plurality of DRUs comprising a first sector and a second sector different from the first sector, each sector comprising a subset of the plurality of DRUs; and
>
> a traffic monitoring unit coupled to at least one of the DAUs comprising the input port and output port each configured as an uplink/downlink port . . . .

'454 patent, claim 1 (emphasis added).

The parties' dispute regarding the term "DRU" largely replicates their dispute above regarding the term "DAU" – *e.g.*, the parties disagree about whether a DRU is part of a DAS and what type of signals are transported. As discussed above, these issues are resolved in favor of Corning. However, there is one part of Dali's proposed construction that the Court adopts, largely because it is a simpler and more direct construction. That is, the Court shall refer to DRUs transporting signals to and from user devices, rather than stating that DRUs connect to (1) user devices on one end and (2) a central facility and/or DAUs on the other end. (The Court recognizes, however, that DRUs are, in essence, positioned between user devices and the DAUs.)

The Court adopts the following construction for DRU: "a unit in a DAS that transports radio resource signals to and from user devices."

C. "sector" terms ('454 patent, claim 1)

Dali's Proposed Construction	**Corning's Proposed Construction**	**Court's Construction**
"a plurality of sectors" / "a first sector" / "a second sector different from the first sector" ('454 patent, claim 1)		
"sector" is "a grouping of DRUs in a particular area or region	"a plurality of independent radio resources" / "first independent radio resources" / "second independent radio resources different from the first independent radio resources"	"sectors" are "independent radio resources"

"a plurality of sectors formed from the plurality of DRUs comprising a first sector and a second sector different from the first sector, each sector comprising a subset of DRUs" ('454 patent, claim 1)		
assigning DRUs into two groupings in a particular area, a first grouping in a first area or region and a second grouping in a second area or region	a plurality of independent radio resources, comprising first independent radio resources and second independent radio resources, to which the plurality of DRUs are allocated	plain and ordinary meaning [*i.e.*, unnecessary to construe given construction above]
"reconfiguring the plurality of sectors based on the one or more KPIs and QoS by allocating at least one DRU from the first sector to the second sector" ('454 patent, claim 1)		
reallocating at least one DRU from one sector to another sector based on the one or more KPIs and QoS	allocate at least one DRU from the first independent radio resources to the second independent radio resources based on the one or more KPIs and QoS	plain and ordinary meaning [*i.e.*, unnecessary to construe given construction above]

The term "sector" or "sectors" is used in the '454 patent. Claim 1 is a representative claim, providing as follows:

> A system for dynamically routing signals in a Distributed Antenna System (DAS) operable to communicate with a plurality of signal sources, the system comprising:
>
> one or more Digital Access Units (DAUs) operable to receive at least one signal from at least one of a first signal source and a second signal source from the plurality of signal sources, each DAU of the one or more DAUs including an input port configured as an uplink/downlink port and an output port configured as an uplink/downlink port;

> a plurality of Digital Remote Units (DRUs) coupled to the one or more DAUs and operable to transport signals between the plurality of DRUs and the one or more DAUs;
>
> a plurality of **sectors** formed from the plurality of DRUs comprising a first sector and a second sector different from the first sector, each **sector** comprising a subset of the plurality of DRUs; and
>
> a traffic monitoring unit coupled to at least one of the DAUs comprising the input port and output port each configured as an uplink/downlink port, wherein the traffic monitoring unit is configured to:
>
> > determine one or more key performance indicators (KPIs) and a quality of service (QoS) of a network traffic for the one or more DAUs, wherein the QoS is a function of the one or more KPIs; and
> >
> > reconfigure the plurality of **sectors** based on the one or more KPIs and QoS by allocating at least one DRU from the first sector to the second sector.

'454 patent, claim 1 (emphasis added).

Although the parties have identified three sector-related terms for construction, the basic dispute for all three terms is whether a "sector" means "a grouping of DRUs in a particular region or area" (Dali) or "independent radio resources" (Corning). The Court rejects Dali's construction and largely adopts Corning's.

In essence, Dali's construction equates a sector with a group of DRUs – *i.e.*, a sector is made up of DRUs. *See* Resp. Br. at 14. If one were to look at claim 1 in a vacuum, then that construction might be plausible. For example, claim 1 on its face refers to "a plurality of sectors *formed* from the plurality of DRUs" and "each sector *comprising* a subset of the plurality of DRUs." '454 patent, claim 1 (emphasis added). However, the specification for the '454 patent shows that that construction is off the mark.

First, the specification expressly defines what sectors are. The specification states at one point: "A typical base station comprises 3 *independent radio resources, commonly known as sectors*. These 3 sectors are typically used to cover 3 separate geographical areas without creating co-channel interference between users in the 3 distinct sectors." '454 patent, col. 5, ll. 2-4 (emphasis added). This express definition cannot be disregarded: sectors are radio resources; it is not defined by DRUs. *Cf. Samsung Elecs. Co. v. Elm 3DS Innovations, LLC*, 925 F.3d 1373,

1377-78 (Fed. Cir. 2019) (stating that a court "will deviate from a claim term's ordinary meaning 'when a patentee sets out a definition and acts as its own lexicographer'"); *Laryngeal Mask Co. v. Ambu A/S*, 618 F.3d 1367, 1372 (Fed. Cir. 2010) (stating that, "[t]o be his own lexicographer, a patentee must use a 'special definition of the term [that] is clearly stated in the patent specification or file history'").

Second, the specification also makes clear that a sector is *not* a group of DRUs. Most notably, in the figures of the '454 patent, it is clear that a grouping of DRUs (*e.g.*, in a hexagon) is called a *cell*, not a sector. For example, below is FIG. 1:

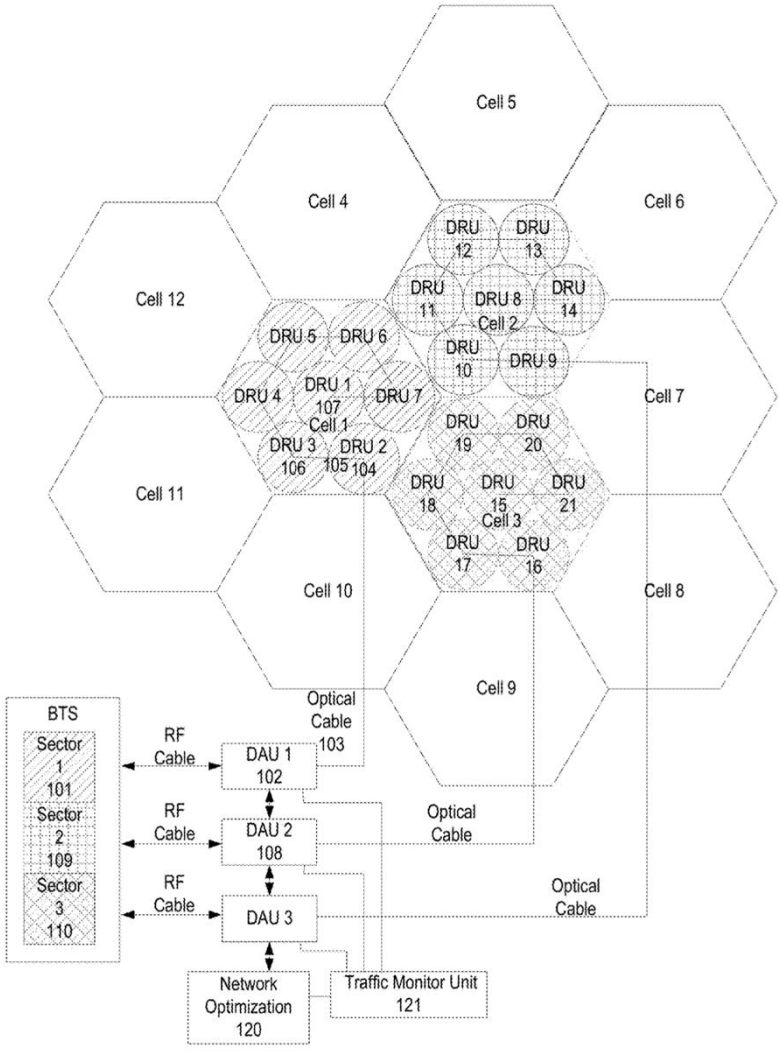

FIG. 1

'454 patent, FIG. 1. This is reinforced by text from the specification: "FIG. 1 demonstrates how

three cells, each cell *comprising an independent network of 7 DRUs*, provide coverage to a given geographical area." '454 patent, col. 6, ll. 58-60 (emphasis added); *see also* '454 patent, col. 5, l. 60-col. 6, l. 1. ("An embodiment shown in FIG. 1 illustrates a basic DAS network architecture according to an embodiment of the present invention and provides an example of a data transport network, traffic monitoring and network optimization scenario between a 3 sector Base Station and multiple DRUs. In this embodiment, the DRUs are daisy chained together to achieve coverage in a specific geographical area. Each individual sector covers an independent geographical area, which is identified as a Cell.").[7] FIG. 1 above also shows pictorially that sectors are *separate* from the DRUs (the sectors are "housed" within the Base Transceiver Station ("BTS") but that the sectors are still *related to* the coverage area of the DRUs.

In its reply brief, Dali argues that "the term 'sectors' has *traditionally* meant a particular coverage area." Reply at 4 (emphasis added). In support, Dali cites to two prior art references that are expressly identified in the '454 patent (*i.e.*, the '530 patent application and the '207 patent). For example, in ¶ 0003 of the '530 patent application, the inventors noted that cells may be divided into sectors. But Dali's position here is not particularly convincing because the inventors of the '454 patent acted as their own lexicographers. So even if different inventors used the term "sector" in their intellectual property, that is not dispositive here. Notably, Dali's own expert did not provide an opinion on the term "sector" in spite of Dali's argument that it has a traditional meaning. *See* note 7, *supra*.

Dali protests still that the prosecution history for the '454 patent shows its construction of "sector" is correct. Specifically, Dali points to its response to the PTO's Final Office Action where it stated as follows:

> The Examiner . . . cites Sombrutzki as disclosing this limitation [*i.e.*, a traffic monitoring unit external to and coupled to at least one of the DAUs, wherein the traffic monitoring unit is configured to: determine one or more key performance indicators (KPIs) and a

[7] Corning's expert points out this distinction between cells and sectors, *see* Proctor Decl. ¶ 67 (stating that "[a] POSA would have . . . understood Dali's proposed construction to refer to 'cells,' not 'sectors'[;] [c]ells refer to geographic areas or regions, which is very different than independent radio resources"), whereas Dali's expert appears to have provided no opinion on sectors at all. *See generally* Bims Decl.

> quality of service (QoS) of a network traffic for the one or more DAUs, wherein the QoS is a function of the one or more KPIs; and reconfigure the plurality of sectors based on the one or more KPIs and QoS by allocating at least one DRU from the first sector to the second sector].
>
> Applicant respectfully submits that Sombrutzki fails to remedy the deficiencies of Grenier [another prior art reference]. Sombrutzki discusses "a method for organizing an architecture of access points in a distributed wireless network," such as "a GPRS network a WiMax type network or an IEEE 9-2.11 type or Wi-Fi network." (Sombrutzki at paragraph [0019]). "The efficiency of an IEEE 802.11 infrastructure network is determined by the achieved level of Quality of Service (QOs). With the proposed method QoS can be improved in terms of an increased data throughput and a decreased latency and jitter." (Id. at paragraph [0026]). Thus, Sombrutzki relates to Wi-Fi networks and access points, which is not analogous to a DAU network. Furthermore, Sombrutzki does not disclose reconfiguring a DAU network based on KPI and QoS. *Nor does Sombrutzki disclose splitting access points into first and second sectors and reconfiguring the wireless network and by allocating at least one access point from the first sector to the second sector.*

Bean Decl., Ex. G (Response at 8) (emphasis added). But the statement above sheds little light on whether, at that time, Dali considered sectors to be, in essence, made up of DRUs. Allocating a DRU from one sector to another does not necessarily mean that a sector is *made up* of DRUs. Rather a DRU may still be allocated to, or associated with, one sector over another. Hence, although the configuration of a sector (based, *e.g.*, on level of QoS) may affect the allocation of DRUs, the sector is not comprised by the grouping of DRUs.

Third, a consideration of other claims in the '454 patent also indicates that a sector is not a group of DRUs. For example, claim 2 of the '454 patent provides: "The system of claim 1 further comprising a plurality of BTSs coupled to the one or more DAUs, *wherein each BTS comprises the plurality of sectors*." '454 patent, claim 2 (emphasis added). As Corning's expert explains with respect to claim 2,

> [a] POSA would have understood that, by having each BTS comprise the plurality of sectors, the sectors are not "groups" of DRUs in a particular area or region. The sectors are included within each BTS, which contain the independent radio resources to which the DRUs are allocated. Under Dali's proposed construction, the group of DRUs would be contained within each BTS, which is not supported by the claims or specification of the '454 patent.

Proctor Decl. ¶ 73.

Finally, contrary to what Dali argues, construing sectors to be radio resources – as Corning

advocates – does not go against the teachings of the patent, in particular, that the invention allows for the pooling of resources. Dali is correct that the '454 patent does talk about the pooling of resources. For example:

- "Once traffic resources are aggregated into eNodeB hotels, the discrete resources of a single eNodeB are still allocated to a specific set of antennas associated with that eNodeB and providing coverage to a specific geographic area. The traffic resources are fixed, i.e., only the resources associated with a specific eNodeB can be allocated to the antennas associated with that eNodeB. *However, because the eNodeBs are collocated in an eNodeB hotel, the system can use the aggregated traffic resources of the discrete eNodeBs as a single, pooled traffic resource that can be allocated according to various algorithms.*" '454 patent, col. 5, ll. 8-20 (emphasis added).
- "The traffic information derived from an extensive sensor network will be used to dynamically allocate the traffic resources to the required geographical areas only for the time period the service is needed. *Once the service is supplied and the traffic sensor network determines that the traffic resources are no longer required, they are returned to the resource pool for reallocation.*" '454 patent, col. 5, ll. 36-42 (emphasis added).

But a pooling of resources is permitted under Corning's construction of the term "sector." As Corning explain in its briefs,

> [s]ectors are independent radio resources that provide capacity and broadband data throughput to accommodate users. Each individual sector of independent radio resources can be used to provide cellular coverage to an independent geographic area, which is referred to as a "cell." The DRUs are fixed in location within each of the cells of Figure 3 . . . and are not reassigned or allocated to different geographic areas or cells. *The cells can share the independent radio resources of the sectors through interconnected DAUs, and the radio resources can be allocated to different DRUs, or conversely, the DRUs can be allocated to different radio resources.* Thus, if one cell has a high volume of traffic at a particular time of day, more sectors (*i.e.*, radio resources) can be allocated to the DRUs in that cell. Therefore, it is the radio resources (*i.e.*, sectors) that are reconfigured within an area or cell to optimize the network, not a reconfiguration of the number of DRUs providing service within a

geographic area, *i.e.*, a cell.

Resp. Br. at 11-12 (emphasis added).

For the reasons stated above, the Court rejects Dali's construction and instead adopts Corning's construction for "sectors" – *i.e.*, "independent radio resources."

D. "a key performance indicator related to a number of satisfied users" ('261 patent, claims 1, 8, 9)

Dali's Proposed Construction	**Corning's Proposed Construction**	**Court's Construction**
"a key performance indicator related to a number of satisfied users" ('261 patent, claims 1, 8, 9)		
"satisfied user" means "users that can achieve a targeted service bitrate" "key performance indicator" means "a measurement of performance of a particular system" other terms provided their plain and ordinary meaning	a key performance indicator defining the percent of users that can achieve the targeted service bit rate	a key performance indicator related to a number of users that can achieve a targeted service bitrate

The "key performance indicator" or "KPI" term above is used in the '261 patent. Claim 1 is a representative claim, providing as follows:

> A method of determining a transmission power of a digital remote unit (DRU) in a distributed antenna system (DAS), the method comprising:
>
> a) Setting a transmission power level for the DRU;

b) Determining **a key performance indicator related to a number of satisfied users** at the transmission power;

c) Iteratively adjusting a transmission power level for the DRU to increase the key performance indicator related to the number of satisfied users; and

d) Setting the transmission power level for the DRU at an iterated power level.

'261 patent, claim 1 (emphasis added).

Here, the parties agree that "satisfied users" means users that can achieve a targeted service bitrate. *See also* '261 patent, col. 5, ll. 5-9 ("[T]o improve the throughput for the cell edge users and further increase the number of satisfied users (the users that can achieve a targeted service bitrate), a downlink Power Self-Optimization (PSO) algorithm for three different resource allocation scenarios is proposed for the DAS -SFR [soft frequency reuse]."). Thus, the dispute between the parties has two components: (1) whether the phrase "key performance indicator," as a general matter, needs to be explained and (2) whether "key performance indicator" for purposes of the specific claim means only the percent of users that can achieve the targeted service bit rate.

1. General Definition

Regarding the first dispute, Dali believes that a general definition for "key performance indicator" should be provided and notes that its definition ("a measurement of performance of a particular system") is consistent with a scientific dictionary. *See* Schumann Decl., Ex. 13 (IEEE 100: The Authoritative Dictionary of IEEE Standards Terms (7th ed. 2000)[8] (defining "key performance indicator" as "[a] measurement of performance of a particular business system in terms of the aims and goals of an enterprise"). But Dali's definition is lacking in that it does not give any real weight to the term "key" and further leaves out the reference point provided in the scientific dictionary ("in terms of the aims and goals of an enterprise"). In addition, as a practical matter, the scientific dictionary provides a definition for "key performance indicator" that is largely consistent with a layperson's understanding of the term (*i.e.*, "key performance indicator" is just a general business term and not a special scientific term). *See, e.g.*, Google Dictionary

[8] The '261 patent has a filing date of August 14, 2017.

(defining "key performance indicator" as "a quantifiable measure used to evaluate the success of an organization, employee, etc. in meeting objectives for performance"); https://en.wikipedia.org/wiki/Performance_indicator (stating that "[a] performance indicator or key performance indicator (KPI) is a type of performance measurement[;] KPIs evaluate the success of an organization or of a particular activity (such as projects, programs, products and other initiatives) in which it engages"). The Court therefore finds that it is not necessary to define "key performance indicator" and that the jury may simply rely on the plain and ordinary meaning of the term. *See Phillips*, 415 F.3d at 1314 (pointing out that, "[i]n some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words").

2. Specific Application

The parties' second dispute is more substantive. Corning asserts that "a key performance indicator related to a number of satisfied users" can mean *only* "a key performance indicator defining the percent of [satisfied] users." Dali disagrees. According to Dali, "'key performance indicator' is not limited to any specific metric such as 'percent' only that it is 'related to a number of satisfied users." Op. Br. at 15.

Corning bases its argument on that part of the specification which discusses the "formulat[ion] [of] the power allocation problem to maximize the number of satisfied users and also maximize the total satisfied users['] capacity." '261 patent, col. 9, ll. 51-53. With respect to the number of satisfied users, the key performance indicator is expressed as KPI_{SU}. The specification notes in relevant part as follows:

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We consider the following key performance indicators (KPIs) in the power allocation system:

1. KPI_{SU} (Number of Satisfied Users): We can derive a metric defining a percent of satisfied users (i.e., users that can achieve the targeted service bit rate, for example, 1 Mbits/s). The percent of satisfied users (out of m users) would be,

$$KPI_{SU}(P) = \frac{\sum_{k=1}^{m} G_k(P)}{N_{user}^{total}} \quad (16)$$

where N_{user}^{total} is total number of users and

$$G_k(P) = \begin{cases} 1 & \text{when } C_k^{real}(P) > C_{th} \\ 0 & \text{otherwise} \end{cases}$$

Using these equations, C_{th} is a threshold capacity (targeted service bit rate) and $G_k(P)$ is unity when the capacity for a user (indexed by k) exceeds the threshold capacity and is equal to zero when the capacity is less than or equal to the threshold capacity.

'261 patent, col. 10, ll. 4-29 (Formula No. 16).

The excerpt above does reflect that KPI_{SU} can be expressed as a percentage. Moreover, it makes practical sense that a percentage would be used – *i.e.*, without knowing the total number of users in the cell, the absolute number would appear to provide little useful information. In contrast, if information about the total number of users is also known, that would appear to be a better gauge of the "success" of the system – identifying what percentage of users in a given cell are satisfied users.

That being said, the Court is not persuaded that a key performance indicator related to a number of satisfied users *must* be expressed as a percentage. There are several reasons why. First, the excerpt above says that "[w]e *can* derive a metric . . . ." This language is inherently non-limiting in nature. At the hearing, Corning argued that this phrase should not be given any real weight because it is simply a convention used by mathematicians without an intent to convey a

non-limiting nature. However, Corning did not provide any evidence to support this specific argument, and the Court is not able to take judicial notice of this asserted linguistic usage. Second, Corning's construction is problematic because claim 1 refers to "a key performance indicator *related to* a number of satisfied users." '261 patent, claim 1 (emphasis added). "Related to" is a broad term which does not dictate Corning's proposed construction of "a key indicator *defining* the percent of [satisfied] users" (emphasis added). Finally, the Federal Circuit has "expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that patent" – not only because "the claims themselves set forth the limits of the patent grant, but also because persons of ordinary skill in the art rarely would confine their definitions of terms to the exact representations depicted in the embodiments." *Phillips*, 415 F.3d at 1323. In fact, the Federal Circuit has stated that "the scope of the invention is properly limited to the preferred embodiment [only] if the patentee uses words that manifest a clear intention to restrict the scope of the claims to that embodiment." *Info-Hold, Inc. v. Applied Media Techs. Corp.*, 783 F.3d 1262, 1267 (Fed. Cir. 2015); *see also Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906-07 (Fed. Cir. 2004) (indicating that, usually, there are "specific reasons dictating a narrow claim construction beyond the mere fact that the specification disclosed only a single embodiment or a particular structure" – *e.g.*, there is explicit disclaimer in the patent specification or the prosecution history reflects express distinguishing of prior art). In the instant case, based on the record presented to the Court, there is no manifestation of a clear intent to restrict the scope of the term to a single embodiment.

Accordingly, the Court adopts the following construction for "a key performance indicator related to a number of satisfied users": "a key performance indicator related to a number of users that can achieve a targeted service bitrate."

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E. "a second key performance indicator related to a capacity for the number of satisfied users ('261 patent, claim 8)

Dali's Proposed Construction	Corning's Proposed Construction	Court's Construction
"a second key performance indicator related to a capacity for the number of satisfied users" ('261 patent, claim 8)		
"key performance indicator" means "a measurement of performance of a particular system" "satisfied user" means "users that can achieve a targeted bit rate" other terms provided their plain and ordinary meaning	a second key performance indicator reflecting the total bandwidth utilization of all users that can achieve the targeted service bit rate at the transmission power	plain and ordinary meaning

This KPI term is used in claim 8 of the '261 patent. Claim 8 provides as follows:

> The method of claim 1 further comprising:
>
> a) Determining **a second key performance indicator related to a capacity for the number of satisfied users**;
>
> b) Iteratively adjusting the transmission power level for the DRU to increase the second key performance indicator related to the capacity for the number of satisfied users; and
>
> c) Setting the transmission power level for the DRU at the iterated power level.

'261 patent, claim 8.

The parties' main disputes with respect to the KPI term are (1) whether a general definition

for "key performance indicator" should be provided and (2) whether a "key performance indicator related to a capacity for the number of satisfied users" should be limited to the equation provided in the specification (Formula No. 17 for KPI_{CSU}).

The analysis above for "key performance indicator related to a number of satisfied users" is essentially applicable here. That is, there is no need to provide a general definition of "key performance indicator," and there is no basis in the record before the Court to restrict KPI_{CSU} to the single embodiment expressed in the specification (even though the embodiment makes practical sense). The Court notes that there is no need to provide any further construction because the parties have no real disagreement as to what is meant by the term "capacity." *See* Bims Decl. ¶ 24 (Dali's expert stating that "[t]he '261 patent uses 'capacity' as throughput or a bit rate achieved by a particular user"); Proctor Decl. ¶ 42 (in discussing "Capacity of Satisfied Users," Corning's expert referring to "the actual throughput of all satisfied users (i.e., the users with a service bit rate above the defined threshold) measured in bits per second (bps)").

F. "the second key performance indicator related to the capacity for the number of satisfied users is a number of users having a capacity above a predetermined threshold capacity" ('261 patent, claim 9)

Dali's Proposed Construction	**Corning's Proposed Construction**	**Court's Construction**
"the second key performance indicator related to the capacity for the number of satisfied users is a number of users having a capacity above a predetermined threshold capacity" ('261 patent, claim 9)		
"key performance indicator" means "a measurement of performance of a particular system" "satisfied user" means "users	indefinite; lacks written description	not indefinite; the issue of written description is deferred

that can achieve a targeted bit rate" other terms provided their plain and ordinary meaning		

The above KPI term is found in claim 9 of the '261 patent. Claim 9 provides as follows: "The method of claim 8 wherein the second key performance indicator related to the capacity for the number of satisfied users is a number of users having a capacity above a predetermined threshold capacity." '261 patent, claim 9 (emphasis added). ("[P]redetermined threshold capacity" means the "targeted service bit rate." '261 patent, col. 10, ll. 25-26 (noting that "C_{th} is a threshold capacity (targeted service bit rate)").

In its papers, Corning argues that claim 9 (1) is indefinite and (2) lacks written description. A claim is indefinite when, "read in light of the patent's specification and prosecution history, [it] fail[s] to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 898-99 (2014); *see also* 35 U.S.C. § 112(b) (providing that "[t]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor . . . regards as the invention"). "Adequate written description means that the applicant, in the specification, must 'convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the [claimed] invention.'" *Agilent Techs., Inc. v. Affymetrix, Inc.*, 567 F.3d 1366, 1379 (Fed. Cir. 2009); *see also* 35 U.S.C. § 112(a) (providing that "[t]he specification shall contain a written description of the invention . . . in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains . . . to make and use the same").

As an initial matter, the Court must consider whether it should address Corning's arguments at this juncture in the proceedings. The Court declines to address the argument related to written description. Written description is an issue of fact, *see Agilent*, 567 F.3d at 1379 (stating that "[s]atisfaction of the written description requirement is a question of fact"); *see also*

Novozymes A/S v. Dupont Nutrition Biosciences APS, 723 F.3d 1336, 1344 (Fed. Cir. 2013), and therefore the Court deems it inappropriate to deal with the issue at claim construction, at least absent a compelling reason to the contrary in this instance.

Indefiniteness is different. "Indefiniteness is . . . a legal determination arising out of the court's performance of its duty construing the claims," although it "is amenable to resolution by the jury where the issues are factual in nature." *BJ Servs. Co. v. Halliburton Energy Servs.*, 338 F.3d 1368, 1372 (Fed. Cir. 2003); *see also Dow Chem. Co. v. NOVA Chems. Corp. (Can.)*, 809 F.3d 1223, 1226 (Fed. Cir. 2015) (stating that "[w]e have consistently permitted courts to submit legal questions which contain underlying factual issues, like obviousness, enablement, or indefiniteness, to the jury"). Given these parameters, a court has some discretion in deciding whether to address indefiniteness at the claim construction phase. As noted by one district court, "[w]hether to decide the issue of invalidity based on indefiniteness at the claim construction stage depends on the particular circumstances and claims at issue in a given case, and is a matter within a court's discretion." *Junker v. Med. Components, Inc.*, No. 13-4606, 2017 U.S. Dist. LEXIS 179955, at *5 (E.D. Pa. Oct. 30, 2017); *see also Cipher Pharms. Inc. v. Actavis Labs. FL, Inc.*, 99 F. Supp. 3d 508, 514 (D.N.J. 2015) (stating that, "to decide indefiniteness during claim construction depends on why the alleged infringer asserts that the claim is indefinite"); *cf. Diamond Coating Techs., LLC v. Hyundai Motor Am.*, No. 8:13-cv-01480-MRP(DFMx), 2014 U.S. Dist. LEXIS 156864, at *11 n.2 (C.D. Cal. Aug. 25, 2014) (noting that, *before* the Supreme Court's decision in *Nautilus*, "it seemed appropriate to resolve indefiniteness at claim construction because the standard [set by the Federal Circuit] was whether a claim term was amenable to construction and whether this construction was insolubly ambiguous"; nevertheless, still concluding that indefiniteness could be addressed at claim construction post-*Nautilus* because a term that is not amenable to construction "will not meet the 'reasonable certainty' standard [laid out in *Nautilus*]" and because "the factual underpinnings involved in claim construction are similar to the factual underpinnings involved in indefiniteness inquiries").

In the instant case, the Court finds that, given the specific nature of Corning's indefiniteness argument (see below), the issue may be decided at claim construction. As noted

above, claim 9 provides as follows: "The method of claim 8 wherein the second key performance indicator related to the capacity for the number of satisfied users is a number of users having a capacity above a predetermined threshold capacity [*i.e.*, targeted service bit rate]." '261 patent, claim 9. According to Corning, claim 9 fails to inform, with reasonable certainty, those skilled in the art about the scope of the invention because it is, in essence, a nonsensical claim. The gist of Corning's argument is as follows:

- The second KPI is KPI_{CSU} (capacity for the number of satisfied users).
- Under claim 9, KPI_{CSU} is equated with KPI_{SU} (the number of satisfied users), *i.e.*, the first KPI.
- In other words, a *literal* reading of claim 9 is that the "second key performance indicator . . . **is** a number of users having a capacity above [a targeted service bit rate]." '264 patent, claim 9 (emphasis added).

In response, Dali argues that claim 9 does not equate the second KPI with the first KPI. Rather, under claim 9, "a number of users having a capacity above a [targeted service bit rate" simply modifies, or limits, the preceding phrase "the number of satisfied users." *See* Op. Br. at 19. Dali adds that this is exactly what the specification teaches. Below is an excerpt from the specification that discusses the second KPI.

> 2. KPI_{CSU} (Capacity of Satisfied Users): The total capacity of satisfied users would be,
>
> $$KPI_{CSU}(P) = \frac{\sum_{k \in SUS} C_k^{real}(P)}{(W_{(F_1)} + W_{(F_2)} + W_{(F_3)})/3} \quad (17)$$
>
> where W_f is the bandwidth of frequency band f and $SUS=\{k|G_k=1, k=1, 2, \ldots, m\}$ is the satisfied users set. If more than three carriers are utilized in a cell, the number of carriers and the divisor in the denominator will increase as appropriate.

'261 patent, col. 10, ll. 30-43 (Formula No. 17). As indicated by the KPI_{CSU} equation above,

satisfied users are a *part* of that equation. And satisfied users are those who exceed the targeted service bit rate:

> We consider the following key performance indicators (KPIs) in the power allocation system:
>
> 1. KPI_{SU} (Number of Satisfied Users): We can derive a metric defining a percent of satisfied users (i.e., users that can achieve the targeted service bit rate, for example, 1 Mbits/s). The percent of satisfied users (out of m users) would be,
>
> $$KPI_{SU}(P) = \frac{\sum_{k=1}^{m} G_k(P)}{N_{user}^{total}} \quad (16)$$
>
> where N_{user}^{total} is total number of users and
>
> $$G_k(P) = \begin{cases} 1 & \text{when } C_k^{real}(P) > C_{th} \\ 0 & \text{otherwise} \end{cases}$$
>
> Using these equations, C_{th} is a threshold capacity (targeted service bit rate) and $G_k(P)$ is unity when the capacity for a user (indexed by k) exceeds the threshold capacity and is equal to zero when the capacity is less than or equal to the threshold capacity.

'261 patent, col. 10, ll. 4-29 (Formula No. 16).

Dali's position is stronger than Corning's. That is, although Corning's position might be plausible if one were to consider claim 9 in a vacuum, the specification itself makes clear that there is no equating of the first and second KPIs. Claim 9 is not indefinite.

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G. "the predetermined threshold capacity is defined by a predetermined threshold bit rate" ('261 patent, claim 10)

Dali's Proposed Construction	Corning's Proposed Construction	Court's Construction
the predetermined threshold capacity is defined by a predetermined threshold bit rate" ('261 patent, claim 10)		
plain and ordinary meaning	indefinite; lacks written description	not indefinite; the issue of written description is deferred

The above KPI term is found in claim 10 of the '261 patent. Claim 10 provides as follows: "The method of claim 9 wherein **the predetermined threshold capacity is defined by a predetermined threshold bit rate**." '261 patent, claim 10 (emphasis added).

Both parties agree that their dispute here mirrors that above for claim 9. Accordingly, the Court's analysis above is equally applicable here.

H. "a differential between a reference carrier and one or more carriers ('261 patent, claim 2)

Dali's Proposed Construction	Corning's Proposed Construction	Court's Construction
"a differential between a reference carrier and one or more carriers ('261 patent, claim 2)		
the difference between one carrier and another carrier	indefinite; lacks written description	both the issue of indefiniteness and the issue of written description are deferred

Claim 2 of the '261 patent is a dependent claim, specifically, a claim dependent on claim 1. Claim 1 provides as follows:

> A method of determining a transmission power of a digital remote unit (DRU) in a distributed antenna system (DAS), the method comprising:
>
> a) Setting a transmission power level for the DRU;
>
> b) Determining a key performance indicator related to a number of satisfied users at the transmission power;
>
> c) Iteratively adjusting a transmission power level for the DRU to increase the key performance indicator related to the number of satisfied users; and
>
> d) Setting the transmission power level for the DRU at an iterated power level.

'261 patent, claim 1. Claim 2 in turn provides: "The method of claim 1 wherein the transmission power comprises **a differential between a reference carrier and one or more carriers**." '261 patent, claim 2 (emphasis added). According to Corning, claim 2 is indefinite and lacks written description.

As above, the Court focuses on the issue of indefiniteness and declines to address written description. In its papers, Corning contends that claim 2 is indefinite because a person of skill in art would not understand, *e.g.*,

- "what the power differential is";
- "how [the power differential] is measured";
- "what constitutes the reference carrier and the 'one or more carriers'";
- "which of the two transmission powers referenced in claim 1 – the initial transmission power in step (a) or the final transmission power in step (d) – comprises 'a differential between a reference carrier and one or more carriers'";
- "how a 'transmission power' can 'comprise[] a differential between a reference carrier and one or more carriers.'"

Resp. Br. at 21-22; *see also* Proctor Decl. ¶ 49.

In response, Dali argues that a person of skill in the art could determine with reasonable certainty the scope of claim 2 based on the following part of the '261 specification:

> Referring to FIG. 4, KPI_{SU} is the Key Performance Indicator for Satisfied Users and KPI_{CSU} is the key performance indicator for the Capacity of Satisfied Users. ΔP is the change in power of the

> carriers. By adjusting the power of the carriers, the number of satisfied users and the capacity of the satisfied users can be increased or optimized. . . .
>
> . . . .
>
> Referring to FIG. 1, the method will be applied in relation to the carriers used in the central antenna (eNB0) of the cell (i.e., hexagon). *For each cell, the carrier used in the peripheral portions of the cell will be used as a reference and the other carriers will have their power set by optimizing the number and capacity of satisfied users using the algorithm described herein.* In some embodiments, the carriers used in the central antenna that are not used in the peripheral portions of the cell will have the same power, providing a single ΔP for the central antenna with the carrier used in the peripheral portions of the cell providing the reference. In some implementations, the carriers used only in the central antenna can have differing powers with the algorithm applied to the carriers individually (e.g., F_1 compared to F_3 and F_2 compared to F_3 for the rightmost cell in FIG. 1A).

'261 patent, col. 13, ll. 19-24; '261 patent, col. 14, ll. 19-25 (emphasis added).

The Court finds that there are questions of fact here – *i.e.*, what a person of skill in the art would understand – that make resolution of indefiniteness at claim construction improper. *See Nautilus*, 572 U.S. at 898-99 (noting that a claim is indefinite when, "read in light of the patent's specification and prosecution history, [it] fail[s] to inform, with reasonable certainty, those skilled in the art about the scope of the invention"). Based on the excerpt of the specification above, Dali has a basis for contending that (1) the "differential" refers to a difference in power between carriers and that (2) the carriers being compared can include, *e.g.*, the one in the peripheral portions of the cell and the carrier with the central antenna. On the other hand, Corning has raised serious questions about whether the definiteness requirement has been met because claim 2 is not limited to a differential between a reference carrier and one other carrier (*i.e.*, two carriers total) but also covers a differential among *three or more* carriers. It is not clear how a comparison is made when there are three or more carriers total, as opposed to simply two.[9]

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[9] Although the Court does not address written description, Corning raised a serious question on this issue as well. The claim does not explain how transmission power level is to be set when there are multiple differentials.

I. "distributing communication frequencies ('358 patent, claim 7)

Dali's Proposed Construction	Corning's Proposed Construction	Court's Construction
"distributing communication frequencies" ('358 patent, claim 7)		
plain and ordinary meaning if construction is required, "assigning or allocating frequencies"	language in the preamble is a limitation; plain and ordinary meaning	language in the preamble is a limitation; plain and ordinary meaning

The term "distributing communication frequencies" appears in the '358 patent. Claim 7 is a representative claim. It provides as follows:

> A method of **distributing communication frequencies**, the method providing:
>
> providing a set of communications units;
>
> transmitting and receiving, from a first communications unit of the set of communications units:
>
> a first set of frequencies characterized by a first frequency band and a first geographic footprint; and
>
> a second set of frequencies characterized by a second frequency band different from the first frequency band a second geographic footprint larger than and at least partially surrounding the first geographic footprint; and
>
> transmitting, and receiving, from a second communications unit of the set of communications units:
>
> a third set of frequencies including one or more frequencies in the first frequency band and a third geographical footprint; and
>
> a fourth set of frequencies including one or more frequencies in a third frequency band and a fourth geographical footprint larger than and at least partially surrounding the third geographical footprint.

'358 patent, claim 7 (emphasis added).

The parties have two disputes regarding the above term: (1) whether the term is a claim limitation even though in the preamble and (2) if the term is a claim limitation, whether it needs to be construed.

On the first issue, Corning argues that the term is a claim limitation even though it is found in the preamble. Corning further argues that Dali is barred from arguing otherwise because, in the parties' joint claim construction statement (filed back in February 2021), Dali did not dispute Corning's assertion that the term was a claim limitation even if in the preamble. *See* Docket No. 72-1 (Joint Claim Construction Chart at 5).

The Court agrees with Corning that Dali has waived its argument. Under the Patent Local Rules, the joint claim construction statement is submitted by the parties *after* the parties have served on each other the infringement and invalidity contentions. *See* Pat. L.R. 4-1 to -3 (discussing exchange of proposed terms for construction, exchange of preliminary claim constructions, and the joint claim constructions statement – all of which comes after service of the invalidity contentions). Allowing Dali to change course now violates the spirit of the Patent Local Rules, which were "designed to require parties to crystallize their theories of the case early in the litigation and to adhere to those theories once they have been disclosed." *Kilopass Tech., Inc. v. Sidense Corp.*, No. C 10-02066 SI, 2011 U.S. Dist. LEXIS 126837, at *3-4 (N.D. Cal. Nov. 2, 2011).

But even if the Court were to consider the merits, Corning would still prevail – *i.e.*, its position that "distributing communication frequencies" is a claim limitation is stronger. As noted above, in general, a preamble limits the invention if it recites essential structure or steps, or if it is "necessary to give life, meaning, and vitality" to the claim. Conversely, a preamble is not limiting "where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention." *Catalina Mktg.*, 289 F.3d at 808. In assessing whether a preamble limits claim scope, a court may consider, *e.g.*, the following:

- "[W]hen the preamble is essential to understand limitations or terms in the claim

body, the preamble limits claim scope."

- "[W]hen reciting additional structure or steps underscored as important by the specification, the preamble may operate as a claim limitation."
- "[A] preamble generally is not limiting when the claim body describes a structurally complete invention such that deletion of the preamble phrase does not affect the structure or steps of the claimed invention."
- "[P]reamble language merely extolling benefits or features of the claimed invention does not limit the claim scope without clear reliance on those benefits or features as patentably significant."
- "[P]reambles describing the use of an invention generally do not limit the claims because the patentability of apparatus or composition claims depends on the claimed structure, not on the use or purpose of that structure." "[S]tatements of intended use or asserted benefits in the preamble may, in rare instances, limit apparatus claims, but only if the applicant clearly and unmistakably relied on those uses or benefits to distinguish prior art."

Intri-Plex, 2018 U.S. Dist. 16877, at *7-8 (internal quotation marks omitted).

In its papers, Corning argues that the term "*distributing* communication frequencies" must be deemed a claim limitation because, *without* that additional limitation, "claim 7 [simply] repeats the well-known, prior art frequency refuse scheme proposed for use in the LTE cellular standard by Ericsson in 2005, which is the same as the reuse scheme shown in FIG. 1C of the '358 patent." Resp. Br. at 24; *see also* '358 patent, FIG. 1C (showing soft frequency reuse, as opposed to hard frequency reuse or fractional frequency reuse). According to Corning, the alleged novelty of the '358 patent is that it combined soft frequency reuse with a *distributed* antenna system (DAS) – hence, the phrase "*distributing* communication frequencies." *See generally* '358 patent (titled "Method and System for Soft Frequency Reuse in a *Distributed* Antenna System") (emphasis added).

In response, Dali contends that the term "distributing communication frequencies" is simply "a descriptive name for the steps that the body of claim 7 *completely* describes." Op. Br. at

23 (emphasis added).

The problem with Dali's position is that nothing in the body of claim 7 ties the invention to a DAS, and a DAS is necessary to give life, meaning, and vitality to the claim. As Corning argues, "[t]he preamble of claim 7 adds the concept of 'distributing communication frequencies,' which is a function performed in a DAS when radio resource signals are distributed from a DAU to a plurality of DRUs, and it must be construed as a limitation for claim 7 to cover the concept of combining DAS and SFR." Resp. Br. at 24. That the invention inherently requires a DAS is plain – throughout the specification, a DAS is mentioned, either explicitly (*e.g.*, in the title, in multiple FIGs., in the "Background of the Invention" and "Summary of the Invention") or implicitly (*e.g.*, through reference to DRUs). For example, the following discussion from the specification is similar to claim 7.

> FIG. 8 is a simplified flowchart illustrating a method of implementing soft frequency reuse according to an embodiment of the present invention. The method 800 includes transmitting and receiving data in a first geographical area and a first frequency band (810). The method also includes transmitting and receiving data in a second geographical area and a second frequency band (812). In an embodiment, the first geographical area is a central area of a cell including multiple DRUs and the second geographical area is a peripheral area of the cell. In another embodiment, the second geographical area includes and extends to an area larger than the first geographical area (e.g., an area surrounding the first geographical area). The method further includes transmitting and receiving data in a third geographical area and at least a portion of the first frequency band (814). At least a portion of the frequency band used for the third geographical area is thus reused in relation to the first geographical area. The method also includes transmitting and receiving data in a fourth geographical area and a third frequency band (816). In an embodiment, the third geographical area is a central area of a cell including multiple DRUs and the fourth geographical area is a peripheral area of the cell. In another embodiment, the fourth geographical area includes and surrounds the third geographical area.

'358 patent, col. 18, l. 48-col. 19, l. 4.

Accordingly, the Court finds the preamble is limiting, whether based on procedural grounds (*i.e.*, Dali's waiver) or because the preamble term is needed in order to give the claim life and meaning. The Court need not construe "distributing communication frequencies," with the understanding that "distributing" essentially implicates a DAS.

J. "a geographic footprint" ('358 patent, claims 7, 9-10, 12, 15, 19)

Dali's Proposed Construction	**Corning's Proposed Construction**	**Court's Construction**
"a geographic footprint" ('358 patent, claims 7, 9-10, 12, 15, 19)		
an area or region near one or more DRUs	radio coverage area	radio coverage area

Finally, the term "a geographic footprint" appears in multiple claims in the '358 patent, including but not limited to claim 7. Claim 7 is a representative claim:

> A method of distributing communication frequencies, the method providing:
>
> providing a set of communications units;
>
> transmitting and receiving, from a first communications unit of the set of communications units:
>
> > a first set of frequencies characterized by a first frequency band and a first **geographic footprint**; and
> >
> > a second set of frequencies characterized by a second frequency band different from the first frequency band a second geographic footprint larger than and at least partially surrounding the first geographic footprint; and
>
> transmitting, and receiving, from a second communications unit of the set of communications units:
>
> > a third set of frequencies including one or more frequencies in the first frequency band and a third geographical footprint; and
> >
> > a fourth set of frequencies including one or more frequencies in a third frequency band and a fourth geographical footprint larger than and at least partially surrounding the third geographical footprint.

'358 patent, claim 7 (emphasis added).

As an initial matter, the Court finds Dali's proposed construction of "geographic footprint" flawed because it does not mention the "property associated with the . . . footprints" – *i.e.*, radio

coverage. Resp. Br. at 24. Given that the parties are asking for a construction that will ultimately to be given to the jury, the concept of coverage should be included. (Dali does not fundamentally disagree that the property at issue is radio coverage, as opposed to some other property. *See, e.g.*, Op. Br. at 23 (asserting that the footprint "should be defined by the area or region in space . . . that DAS operators intend to cover with *radio coverage*") (emphasis added).)

As for Corning's proposed construction, Dali contends that it is problematic because, "under [the] proposed construction[,] each 'geographic footprint' would always be filled to the center, inconsistent with the specification's descriptions of 'peripheral' and 'surrounding' geographic footprints." Op. Br. at 23. Although it is not clear how simply referring to "radio coverage" would convey such to the jury, Corning does assume that a footprint is filled to the center. *See* Resp. Br. at 25 (asserting that the specification shows "how a communications unit, such as a DRU, generates the claimed geographic footprints shown in FIGS. 1A-1C[;] [a]t bottom, the different footprints are created *by transmitting different frequencies in different cells at varying power levels*, as shown in FIGS. 1C-1F") (emphasis added). That assumption is substantiated by the specification:

> Referring to FIGS. 1C-1F, frequencies in the grey frequency band (~upper 2/3 of the available frequencies) are transmitted/received by a DRU at a first power level in Cell 1, providing coverage for the central portion of Cell 1. Frequencies in the horizontal stripes band are transmitted/received by the DRU at a second power level higher than the first power level, *providing coverage over both the central portion of Cell 1 as well as the peripheral portions of Cell 1 since the higher power level results in a larger coverage area*.

'358 patent, col. 8, ll. 1-9 (emphasis added). Dali has not shown how Corning's assumption is incorrect in light of the above.

Perhaps recognizing this dilemma , Dali seems to have changed its argument in its reply brief. In the reply, Dali contends:

> Dali's proposed construction captures that "geographic footprints" are defined by the system operator as the area or region [intended] *to be covered* by a DRU with radio signals. Corning argues "geographic footprints" should be defined by the area over which that radio coverage [actually] extends – such that footprints would change in size and dimension as the power of the radio signals increases or decreases. Corning's responsive brief therefore has it

> *exactly backwards*. Dali does not contest that the coverage area of radio frequency signs can be adjusted by modifying the power level used by the DRU. The point of distinction between the parties' constructions is that under Dali's proposal the operator would adjust those power levels to cover the intended "geographic footprint" with those signals, rather than defining the "geographic footprint" by the scope of the signals.

Reply at 14-15 (emphasis added). The difficulty with Dali's argument is that it is not clear that Corning is advocating for what Dali says it is. In any event, Dali's argument was not brought up until reply, which is, as a general matter, improper.

Accordingly, the Court adopts Corning's proposed construction for the term "geographic footprint" – *i.e.*, "radio coverage area."

III. CONCLUSION

For the foregoing reasons, the Court adopts the constructions specified above.

IT IS SO ORDERED.

Dated: July 19, 2021

EDWARD M. CHEN
United States District Judge

United States District Court
Northern District of California